Lec 42: Linguistic input, BTR

Welcome back. Today we will start with lecture 2, where we will look at when linguistic experience begins, what the nature of linguistic experience that children are exposed to is, and how it impacts, or if it impacts, their language acquisition, and if so, how. This is what we will look at. In the previous lecture, we saw that various kinds of scenarios have proved that the environment does not seem to stop children, even if there is a seriously disadvantaged scenario; the environment is not exactly conducive, yet children have learned language, went about their way, and even invented sign language in some cases. Now, we will look at when there are inputs in the environment, when the environment is normal, what kind of speaking people are around them, there are regular conversations going on, and then, if there is an adequate amount of linguistic input that the child is exposed to, then what happens, how does the story unfold. So, before birth, external auditory stimuli are already available when they are in the fetal stage.

We have already seen that in the segment where we talked about phonology. In the prenatal stage, they are already exposed to languages. So, a mother's voice is a prominent sound in the amniotic fluid. So, as a result, they can be sensitive to their mother's voice, to their own language, to the stress patterns of the language, to one language versus another, and to many other things that we already know.

And they can also identify a familiar story from an unfamiliar one. Just to recall, just to refresh your memory, we talked about the Cat in the Hat story where the mothers were instructed to read the story to the unborn baby. And after the child was born, a few days later, the story was that this story, along with unfamiliar stories, was read out to them, and they showed a tendency towards interest, you know, in the known story. So, they showed through the various kinds of mechanisms that we typically use that they apparently

recognize the story. And the control subjects, however, did not show any such preference, so that means they are already exposed to the linguistic environment.

So, similarly, many infants are exposed to more than one language. However, this does not create any problems for them in identifying their maternal language among other languages. So, this is not a problem at all. So, for example, Mehler et al. looked at 4-day-old French infants and 2-month-old American infants to see whether they could distinguish languages, and they could.

A French-Russian bilingual woman and an Italian-English bilingual woman each recorded a narrative in their two languages; in both cases, the infants showed a preference for their own language. So, such kind of findings are there, many findings are there showing that infants are already exposed to linguistic input in the prenatal stage. We have discussed many more of these examples before, so we will not go into more detail. Now, let us look at the nature of the input. So, what kind of input is required? The examples that we talked about looked at the stories and the other things, but once they are out in the world, the neonatal stage onward, the kind of language input that they get is what we will now look at.

So, it is possible that the language input to which the newborns are finely tuned may be more structured. So, the ambient language that the child experiences may have some sort of structure; there may be some sort of cues that help them learn language. So, for example, one specific example that we will be looking at is what is called the baby talk register. Baby talk register is the way adults speak to children. So, the manner of speaking of adults often changes when they are with children; they make certain changes, and we will shortly see the kinds of changes that we typically make.

So, this language used by adults, any kind of adult mothers, you know, any parents or other caregivers, has a specific structure, and this is what is called BTR (baby talk register); it is also called motherese, parentese, child-directed speech, caregiver speech, and so on and so forth. This register has some features; they are not universal but tend to be similar across languages. So let us look at these features. These features indicate that the speech is specific in terms of a few properties that cover topics, including acoustic features, syntax, and discourse. There are others as well, but we will just focus on these few.

So, first and foremost, what are the typical topics of child-directed speech? Adults typically talk to children about the here and now. This is how Clark puts it: they talk about

the here and now, everything that is there. You do not talk about, you know, history or the future very much; typically, they will point to things and name them, or they will play with them and discuss the, you know, objects with which they are playing, and so on. So, there is a running commentary on the child's actions and the anticipated actions as well. So, as the child is playing, "let us play with this doll". Do you like this toy? that kind of thing.

Objects that are interesting to the child include the naming and description of these objects, and sometimes even the relationships among them. So, basically, the environment in which the child and the parent are will be talking about those things rather than things that are not there; that is one of the most tell-tale markers of child-directed speech. Similarly, in terms of acoustic features, we have various properties like prosody, syntax, and lexicon as well. So, regarding acoustic features, we are talking about prosody.

So, you will have a high pitch, exaggerated contours, and a slow rate. So, the rate of speech is typically very slow. The pitch changes; there are findings that suggest that when you speak to a child, the regular rate of pitch is not followed; it will be at a slightly higher pitch than normal speech. Similarly, exaggerated contours of the vowels and others are used as well. Syntax will also have differences, so short sentences, parataxis, telegraphic speech, repetition, and so on will be followed.

Lexicon will typically cover kin terms and body parts, infant games, qualities, compound verbs, and so on. So, there is a typical list of things that the baby talk usually involves. In phonology, there will be cluster reduction, liquid substitution, reduplication, and then special sounds. Often what happens is that some sounds might be difficult for the child to pronounce, so the adult will replace them with something else. Reduplication is also a very common feature across languages when we talk about baby talk.

Similarly, cluster reduction allows consonant clusters to be broken down with a vowel in between and so on. Similarly, discourse also has different kinds; the discourse patterns are also different. There will be questions, pronoun shifts, and so on. So let us talk about the syntactic features in a little bit more detail. What do we mean by syntactic features, and how are they different in the case of baby talk? So, first and foremost, the most important thing that many researchers have pointed out is the shorter MLU.

MLU stands for mean length of utterance. So, how long are the sentences and how long are the utterances typically when you are talking to a child? Let us say that right now, as I am speaking, my sentences are long; sometimes there are embedded clauses, and sometimes I am just putting two sentences together with, you know, "and" and a "however" kind of thing. So, these things are not typically part of baby talk; the baby talk register will have shorter sentences. So, the mean length of utterance for baby talk register will be

shorter. So, how is it calculated? Collecting 100 utterances spoken by a child and dividing the number of morphemes by the number of utterances.

That is how the mean length of utterance is calculated when we are looking at children's speech. The same kind of mechanism is also used for adults. A higher MLU typically refers to higher proficiency. So, in terms of adult speech towards children, the MLU will be lower. So, the adult utterances will have fewer items; the length will be less.

That is a common finding. Similarly, there are fewer verb forms and modifiers. Child-directed speech has very few verb forms. We do not use all the different kinds of verb forms that are typically part of the grammar. So, let us say a lot of inflections will, you know, not be used; modifiers will not be used, and so on.

So, in English, for example, the researchers have pointed out that the present form of the verb is more commonly used than the other ones. For example, the past tense is used to describe actions that have already happened. So, the past tense is used less and the present tense is used more. That is the one reason for this could be that the focus of the conversation, the focus of discussion, will typically be on the here and now, the things that are right there. So, that could be one reason, but this seems to be a constant feature.

Similarly, fewer subordinate clauses per sentence and per utterance when talking to children result in adults using simple utterances and shorter sentences; that is why the mean length of utterance is less. So, only one clause in each utterance avoids using complex utterances and so on. So, it's basically a simplified version of the language rather than making it very complex. So, sometimes the more verbless sentences are also used; sentences lack verbs and hence the predicate is missing. They are ungrammatical sentences, of course, but that is how often the motherese or the baby talk register works.

Similarly, there are more content words and fewer function words. So, this type of speech is characterized by having more content and fewer function words. Content words are easy to denote because the referent is readily available. So, if you are talking about nouns or if you are talking about adjectives and verbs, these are content words. So, the referents of those content words are around them.

So, it is very easy for them to understand, and probably that is the reason they are used more. Then we come to the discourse features of BTR. So, there are reports that more interrogatives are used in discussions than in any other format. So, interrogatives and imperatives are used more often than the other types of sentences. The reason is that researchers have provided that the interrogative is used to encourage children to respond.

So, that you give them the opportunity to speak, this is to encourage them to speak. So, what is this? Is this a toy? What color is this? So, if this is by way of teaching in some sense, the parents use this kind of format very often. The reason is probably that they want the child to respond. So, while they respond, they learn, and they are able to produce speech. The imperative is often used for giving commands or requests.

For example, come here, sit there, let us play with this; you know, like this. So, these kinds of sentences are more common than other kinds. So, these are the discourse features. Similarly, the more intelligible the speech, the more parents or any other caregiver make it a point to speak slowly, speak more intelligibly, and speak more simply, because the goal here is to make the child understand and probably also to learn and speak themselves. So, that is why the speech is made intelligible; of course, it has to be intelligible.

But what we mean here by intelligible is that it is very important to make the conversation smooth in language acquisition; parents or other adults consciously make it simpler. So, that is what we mean by intelligible speech, which is also characterized by the number of words per sentence and so on. More repetitions are also a hallmark of this kind of child-directed speech. So, utterances are often repeated many times in order to make it clear to children; indirectly, this may also help them understand the language faster. Many scholars have pointed out that babies actually learn from BTR because the discussion on BTR, as you have seen, points towards a factor that adults probably think they are teaching children the language.

So, they are making an effort by tweaking the sound structure, tweaking the sentence structure, and tweaking, you know, everything. So, this has been taken as proof that children probably learn language by using it. So, it turns out that parental speech is well-informed and suited to the child's psycholinguistic capacity. At that stage, the kind of necessity the child has is provided by the parent's speech. Also, children have been found to prefer motherese when given a choice in experiments.

These were taken as evidence against the Chomskyan claim that language cannot be learned from the parents' spoken sample without the innate component. So, because this sample is complex and syntactically degenerate, that is what the Chomskyians say. Children simply cannot learn language from the environment because it is degenerated as we have just seen. It is simplified; the complex clause structure is done away with, difficult verb structures are not used, and so on. So, how can children learn languages? However,

there   are   some   cases   that   seem   to   go   against   this   idea.

Now, based on Ferguson's findings, it has been proposed that perhaps BTR is designed to meet the requirements of infants and hence structures their language learning. However, this tussle has been going on as other scholars in the Chomskyan tradition have rejected this proposal on the basis of more nuanced findings in motherese in later days. We will look at some of those findings later. So, they propose that BTR, at most, is an effective interaction rather than a true language tool for language acquisition, just like an affective conversation. So, the concerns raised are that children would not be able to learn adult language if they remain restricted to BTR.

So, if BTR is the only source from which children are learning language, then they will never master it because, as we have just seen, BTR is severely simplified. So, slowing down the speech rate does not automatically teach the linguistic units; just because you are speaking slowly does not mean the child automatically picks it up. So, transformation in BTR are also not always rule governed and often not really simplified as well, exceptions also exist. What if the adults are imitating the infants rather than the other way around? This also happens; often you will see this is very common with children who often are not able to pronounce difficult consonants, for example. So, the velar consonants are often difficult;   the   alveolars   are   difficult.

They go for dental; they replace them with dental sounds. So, children often do that. So, they use the mora of /ta/ in place of /Ta/, let us say. So the adults also mimic that. So, is this   how   BTR   is   formed?   So,   there   are   these   kinds   of   concerns.

Similarly, infants' listening is not restricted only to child-directed BTR; they are listening to various other kinds of language as well. when the adults are talking among themselves, that also they pick up. So, that is another domain of concern. High-pitched utterances by parents may attract infant attention, but they do not mean it is required for learning. So, each of the features that we have seen till now—the acoustic changes the parents make, the simplification that they make—all of these have been flagged as actual problems rather than solutions for language learning.

Now there are some empirical studies that have looked at this kind of criticism. One particular community, the Zunil community, is a Guatemalan farming community. They were studied for language acquisition concerning parental input. This study dates back to 1986 and was conducted by Clifton Pye. So, he studied the adult-to-infant speech and

compared it to adult-to-adult speech in order to evaluate the BTR's properties.

They also conducted an acoustic analysis of the data to find out the changes that adults make with respect to BTR and adult-to-adult speech. Though the Zunil infants are always kept close to their mothers and accompanied in their daily activities, the vocal interactions between infants and parents are minimal. This is very crucial because we have seen this before as well. Some communities do not make an overt effort to have much child-directed speech because they consider it not very important, as children do not understand anything. So, why talk to them about that kind of thing? So, the same understanding applies here as well; the children are always with the mother.

In fact, they are sometimes tied around the mother, and as the mother goes about the day's work, the child is constantly there. However, there is no specific child-directed speech, nor much of a child-directed speech as such. What they found out was that mother's speech was not high-pitched, slow rate, or exaggerated contour. Basically meaning that they were not making an exaggerated effort to speak in a way that the child would understand or making it a separate kind of register. Rather, the speech had equal morphological complexity, mean length of utterance, and amount of repetition as the adult-directed speech.

Now this goes against most of the findings from other languages. To make matters more complex, this language, which is Kiche, also has some special sounds, some special verb suffixes, few overt noun phrases, a complex system of verb termination, and so on and so forth. This is a complex language, particularly when you think in terms of English and other similar languages. So, one such example is this: this looks like just a word.

This is actually a sentence: I will go and bring it. So, this is how we can break it down grammatically. So, the main point here is that the mothers were not exactly using a specific form of language to simplify such a complex language for the children. They were using the same kind of structure that is part of their adult-to-adult language communication. So, the language spoken to the children typically lacked the simplifications found in other languages. Sometimes it may also include features that increase its complexity, special sounds, special verb suffixes, and so on and so forth.

So, the strong motherese hypothesis may or may not be tenable as a result. What is the strong mother hypothesis? Says that the features of child-directed speech play an essential role in language acquisition. That is the strong motherese hypothesis that motherese help in language acquisition. But this kind of finding shows that this may not be a very tenable position with respect to various languages in the world because not all languages have the

same features. Another important experimental study from Gleitman's group asked the main question: Is BTR a language teaching mechanism? So, the similar kinds of questions that they were asking.

So, there were two main premises of the study. The idea was that if mothers differ in the degrees of motherese used with the child, then there will be an equivalence between the level of complexity of the motherese and the level of complex language that the child learns. So, there has to be a reflection of how the mother uses the language, and you will see the same reflection in the child's speech. So, there should be a positive correlation between these two mothers' speech and the child's speech. Secondly, if the mother is acting as a teacher, then as the mother's speech grows in complexity, so should the infant's; that was the basic premise. Subjects were mother-daughter pairs in three age groups of infants: 12 to 15 months, 18 to 21 months, and 24 to 27 months.

These pairs were interviewed twice, six months apart. Now, how was the data calculated? Data from interviews were analyzed for specific measures, including specific length of utterance, our mean length of utterance, complexity of the sentences, utterance types, repetition, etc. Correlations were then computed between every component of mothers' speech and growth in child language. So, depending on all these factors in the mother's language, they were correlated with the growth or development of those factors in the child's speech. What does the result show? Results showed that the vast majority of properties of maternal speech did not positively correlate with the developing complexity of a child's speech. So, depending on the structure of the mother's speech was not a very good predictor of the structure of the child's speech; that is what it basically means.

So, the length and complexity of the mother's utterance did not correlate with the same features in the child's language. Similarly, the amount of repetition did not have any positive correlation with any form of language growth measured. Only two kinds of correlations were found to be significant. The number of yes-no questions correlated with the development of overt auxiliaries in the child's verb phrases, although the absolute number of auxiliaries in the mother's speech did not correlate. One reason for this could be when you ask questions, yes or no questions, such as "Did you eat?" or "Have you seen my specs?" So, this kind of question, because it fronts the auxiliary verb, could be a reason why they found a correlation.

But the use of the absolute number of auxiliaries in the mother's speech has no correlation with the child's speech. Noun phrase inflections, for example, plural in the child, developed in correlation with the amount of deixis in the mother's speech. So, there were some correlations, but for most cases, there were none. Mother's MLU correlated with the child's age, but not with the corresponding language development. What this basically means is

that the MLU in the mother's speech did not have a correlation with the MLU in the child's speech.

However, the MLU in the mother's speech changed with respect to the child's age. So, when they were very small, you used shorter MLU with fewer words. As they grow, the MLU also goes up. That is understandable; that is expected as well. But in terms of speech correlation between mother and child, there was hardly any positive correlation found.

So, overall, the motherese hypothesis was found to be untenable. Then there was another domain that had been studied, which is called the case of super vowels. Super vowels are just the modified version of vowels that are found in the motherese of certain cases. So, in this study, mothers' speech to their 2 to 5-month-old infants in three countries—US, Russia, and Sweden—was studied. These were recorded and subjected to spectrographic analysis. And then, what did they find? Mothers produce acoustically extreme vowels; that is why they are called super vowels or extreme vowels when talking to their infants, which is not the case when they talk to other adults.

So, basically, they were lengthening your vowels, you were using a higher pitch, you were changing the acoustic and various other acoustic signals; by doing all of this, you were creating an extreme version of the usual vowel. which you do not do when you speak to other adults. So, that is what they found: specifically, what was changed were the fundamental frequency, duration, and the vowel formant frequency; these were matched, and it was found that both F0, that is, fundamental frequency, and duration were changed—increased, and so was the vowel space. This was a very well-known study by Kuhl. So these three vowels specifically were studied and found to have higher fundamental frequency and duration, and even the vowel space was called stretched.

So, Kuhl et al. suggested that this enhanced vowel space helps in learning these three vowels. The extent to which this is useful for the infants making finer distinctions among the vowels, however, is contested; there are counterclaims as well, one of which came from Barbara Lust. The reason why the contestation happened was that the vowel space was enlarged; it was increased, or, you know, the extreme vowels were created. However, within that increased vowel space, the Swedish children had to learn to distinguish between 16 variations corresponding to different vowels within this space, while English needed to distinguish 9 and Russian 5. So, it is not exactly very useful because the vowel space extension happens similarly, but how does it correspond? It does not correspond one-to-one with the number of vowels in these languages, as the different kinds of variations that these languages recognize may not have a one-to-one mapping.

So, this is where we conclude our second lecture, where we discussed the various kinds of linguistic input that children receive from a very early age until the time they are expected to speak in words. What kind of language are they exposed to? Primarily in terms of the BTR, which is baby talk register, motherese, or whatever you call it. The specific features of that language include claims that BTR, because of its structure and the way it is created, typically reflects the way it is used in many languages of the world; those structures are in place because they help the child learn the language. So, that was the claim, and this claim was checked with various groups, and it was found to be not exactly as per expectations, as a result of which the stronger hypothesis of the motherese is found to be not tenable.

So, we will look at some more studies in the next lecture. We will continue with BTR, but we will stop here for this lecture. Thank you.